U.S. DEPARTMENT OF ENERGY | Nuclear Energy

# Small Modular Reactor Licensing Technical Support Program Overview

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## Meeting Clean Energy and Economic Goals

- **Potential Benefits**
  - Enhanced safety and security
  - Reduced capital cost makes nuclear power feasible for more utilities
  - Shorter construction schedules due to modular construction
  - Improved quality due to replication in factory-setting
  - Meets electric demand growth incrementally
  - Re-establish U.S. technical leadership in nuclear energy via international sales
  - Domestic job creation potential very high
- **Potential Markets**
  - Domestic and international utility markets
  - Non-electrical (process heat/desalination) customers

Courtesy of Lehigh Heavy Forge

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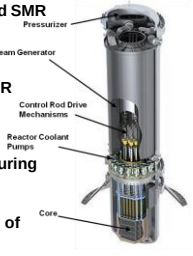
## Goal of SMR Licensing Technical Support Program

- **Facilitate and accelerate commercial development and deployment of U.S.-based SMR designs at domestic locations**
- **Provide financial assistance for design, certification and licensing of promising SMR technologies with high likelihood of being deployed at domestic sites**
- **Does NOT support procurement, manufacturing or construction costs**
- **5 year/$452 M program; Requires minimum of 50% industry cost share**




**The US Government wants to support the safest, most robust SMR designs that minimize the probability of any release**

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## Supporting SMR Development Through Public/Private Cost-Shared Funding

- **DOE's initial SMR funding opportunity announcement (FOA) solicited certification and licensing projects from vendor/utility teams with plans for expeditious deployment**
- **DOE determined that we would make a single award under the initial FOA**
- **Generation mPower project was DOE's top choice**
  - Selection made on November 21, 2012
  - Cooperative Agreement negotiations underway
  - Awards expected to be finalized in late March 2013
- **Efforts under the initial project will help resolve generic industry regulatory issues and establish the SMR licensing framework**

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## Already Making Progress on Certification and Licensing Scope

- **mPower Team**
  - B&W – Design of primary components and systems
  - Bechtel International – Design of secondary side and plant layout
  - Tennessee Valley Authority – Site characterization and licensing for deployment at Clinch River Site
- **On Feb. 20, 2013, team signed contract to prepare and support NRC review of Construction Permit Application (CPA)**
- **Key Project Milestones:**
  - B&W submits DCA – 3Q CY 2014
  - TVA submits CPA – 2Q CY 2015
  - TVA submits OLA – 3Q CY 2019

**Success depends on quality of application products delivered to NRC to ensure a reasonable review and approval period that can support 2022 deployment goal**

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## Second SMR FOA: *Cost-Shared Development of Innovative Small Modular Reactor Designs*

- **To increase available pool of innovative domestic SMR technologies, a second FOA will be issued that emphasizes improved technologies**
  - Issue date: March 2013
  - Applications Due: July 1
  - Award(s) made: Target–End of CY
- **Narrows support to design certification only**
- **Intent is to support one additional award, but may support additional designs if warranted**
- **Expands licensing horizon to technologies that can be deployed in 2025 timeframe**
- **Selection most heavily weighted on extent to which SMR design incorporates safety, operability, efficiency, economic and security performance characteristics that exceed capabilities of designs currently certified by NRC**

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## Design-Independent Support for Licensing and Commercialization of SMRs

**SMR LTS program also supporting efforts to improve commercialization potential for overall SMR industry:**

- **SMR Utility Requirements Document (URD) –** Cost-shared with EPRI/industry
- **Economics –** Follow-on to University of Chicago study to update assumptions made on cost of money and prices of natural gas and coal
- **Source Term** – Plans to evaluate experimental and analytical efforts required to quantify SMR source terms
- **Safeguards Study –** independent laboratory analyses of LWR SMR safeguards and security design and technical features.

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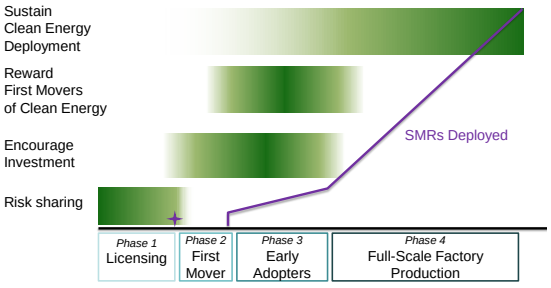
## Examining Policies and Programs to Facilitate Broader SMR Deployment

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## Advanced SMR Program

- **Perform research that supports licensing and deployment of advanced non-light water SMR designs**
- **Focus Areas:**
  - Instrumentation, Controls and Human-Machine Interface
  - Materials, Components and Technology Development
  - Safety, Regulatory Framework, and Safeguards
  - SMR Assessments (Performance and Economic Analysis and Evaluation)


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